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greatest moral philosophers. The worth of his ethical system has not been recognized as yet, partly because it was left in scattered and fragmentary form, and partly because it was overshadowed by the great work of Kant appearing soon after. The author of the present essay aims to remove the first hindrance by presenting Tetens's moral philosophy in its systematic entirety. In the first part of the book the psychological basis of the theory is given in detail; in the second the doctrine of moral values is explained. As Störring proves that Tetens's epistemology is a synthesis of Hume and Leibniz, so our author shows that his moral philosophy is a union of certain tendencies in English ethics with the rationalistic principles of Leibniz. Two grades of virtue are distinguished. The higher, which has absolute value, consists of complete self-mastery. It is the essence and perfection of virtue. In it the will rises supreme over all desires and emotions, and subordinates them to its rule of duty. In this ideal of absolute virtue we detect the influence of the Leibnizian philosophy. All absolute worth in man is a quality of soul because soul alone in human nature has incorporeal unity and thus is truly real. Hence the greater the strength and spontaneity of soul in man, the greater his reality. That faculty in the soul which possesses most spontaneity, viz., the will, has greatest worth and hence in its perfect freedom lies absolute virtue. The lower form of virtue, which has only relative value, is that of kindness of disposition. Here the desires and impulses are of such a nature and so adjusted that the conduct of the individual tends to increase his own happiness and that of his fellow-men. In this disposition the feeling of sympathy is the controlling factor. In his emphasis upon the principle of sympathy and his account of its development Tetens shows the influence of Hume and English ethics.

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La logique et l'intuition en mathématiques. E. BOREL. *Revue de métaphysique et de morale,* May, 1907. Pp. 273–283.

The author seeks an appropriate view of invention and discovery in mathematics, and aims to assign to this phase of mathematics its proper place in teaching the subject.

The importance of a knowledge of the principles of mathematics in the development and progress of the science proper has been grossly exaggerated. This exaggeration results in an erroneous impression upon some students that the whole realm of mathematics is controlled by deductive logic. The contention of the author is that the peculiar function of mathematics consists in the invention and discovery of analytic facts and the laws which govern their relationships. For such discovery Borel finds that the knowledge of the principles is not essential.

The material for the science of mathematics is derived from logic in quite the same way that the physicist obtains his objects of inquiry from nature. Logic gives to mathematics a great number of formulas and propositions. From these the mathematician chooses the fundamental notions for his constructions. Indeed the work of the science proper begins when the mathematician makes this selection of certain formulas and relates them according to general theories. But one does not say that the natural objects of the physicist are the science of physics. Neither should we say that the formulas contributed by logic constitute the science of mathematics. This distinction of the principles of mathematics from the mathematical science proper is essential to Borel's point of view.

The peculiar work of mathematics, as stated above, consists of invention and discovery, which is, as will be shown later, more intuitive than deductive. For invention in mathematics is precisely what it is in any other science. The discovery, by Newton, of universal attraction was simply a new way of explaining given facts. Just so mathematical discoveries are merely new ways of explaining known facts. So that, in this particular, logic does not play any greater part here than it does in any other science.

To make clear his meaning of mathematical invention and to show what part logic plays in actual mathematical constructions, the author cites a number of examples from the different branches of mathematics. The following are typical of all the illustrations given:

Given four points, A, B, C, D, on a straight line Δ, a point O not in Δ, and Δ' another straight line not passing through O. Join OA, OB, OC, OD which meet Δ' in A', B', C', D', we shall then have:

$$\frac{CA}{CB} : \frac{DA}{DB} = \frac{C'A'}{C'B'} : \frac{D'A'}{D'B'}$$

This is a simple theorem in geometry. Its proof has been known for a long time. But to discover in this theorem the theory of an harmonic ratio and its numerous consequences required the genius of Chasles. Instead of being a simple theorem in geometry it becomes the fundamental notion of projective geometry. To make this discovery no deductive logic was required. It was made precisely as discoveries are made in the natural sciences. Nor did the new discovery invalidate the old theorem of geometry. It merely presented a new way of explaining the given facts.

The shortcomings of logic to explain the whole of mathematics is clearly and forcibly shown when we examine two orders of inquiry apparently different in character between which a close correspondence has been established. When Klein finds that the study of the regular icosahedron simplifies to a considerable extent the algebraic theory of the equation of the fifth degree, and that, furthermore, this correspondence throws light on the study of the differential equation of the second order, one sees clearly that the discovery was not the result of deductive methods solely.

Again, if we examine certain general theories of mathematics we shall find here also that logic does not occupy the entire field. Thus the theory of the functions of the complex variable is developed in two distinct ways. Weierstrass develops the theory deductively, while with Riemann the geometric representation of the complex variable is essential. Thus the intuitive character of even such an abstract theory is evident.

The article closes with a plea for more adequate pedagogic methods in the teaching of mathematics. From the point of view of the student, the chief aim has been to develop the logical faculty. While this is not to be neglected, Borel would introduce such methods as would foster mathematical inventiveness with the aim of developing the mathematical ability to discover analytic facts and the laws governing their relationships.

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